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CONTRACT MANAGEMENT PAPERLESS AUTOMATED SUPPORT SYSTEM AND AUTOMATION OF IN-PLANT QUALITY ASSURANCE REPRESENTATIVE RECORDS ECONOMIC ANALYSIS

Scott B. Tilley
Allan R. Greve

OPERATIONS RESEARCH OFFICE

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DEPARTMENT OF DEFENSE
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Prepared by
Scott B. Tilley
Alan R. Greve

DLA OPERATIONS RESEARCH OFFICE
c/o Defense General Supply Center
Richmond, VA 23297-5000

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Prepared for

DEPARTMENT OF DEFENSE
DEFENSE LOGISTICS AGENCY
Executive Director (Plans & Policy Integration)
Corporate Research Team
Cameron Station
Alexandria, VA 22304-6100

DEFENSE LOGISTICS AGENCY
HEADQUARTERS
CAMERON STATION
ALEXANDRIA, VIRGINIA 22304-6100

CAI

FOREWORD

This report outlines the findings of an economic analysis done on the Contract Management Paperless Automated Support System (COMPASS) and the Automation of In-Plant Quality Assurance Representative Records (AUTOQAR). The COMPASS analysis included the Audit Transmission System (ATS) and the Terminations Management System (TAMS).

Christine L. Gallo

CHRISTINE L. GALLO
Executive Director
Plans and Policy Integration

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SECTION 1
INTRODUCTION

1.1 BACKGROUND

1.1.1 AUTOMATION OF IN-PLANT QAR RECORDS (AUTOQAR)

Most Quality Assurance Representatives (QARs) work at the contractor's plant. Most of the mandatory logs, registers, and statistical data are compiled and maintained manually. Much of this information is used repetitively and thus lends itself to automation. Significant savings can be generated from the elimination of manual forms, reports, and in-plant records. AUTOQAR reduces QAR record-keeping time enabling them to accomplish a greater workload with less people. AUTOQAR affects approximately 3,300 resident QARs covering 1,100 facilities and 2,200 non-resident QARs servicing approximately 18,000 facilities.

1.1.2 CONTRACT MANAGEMENT PAPERLESS AUTOMATED SUPPORT SYSTEM (COMPASS)

COMPASS is a system that downloads Mechanization of Contract Administration System (MOCAS) data daily to Administrative Contracting Officer (ACO) team personnel. The system produces canned reports such as: contracts by buying activities, top 10 contractors, top 10 buyers, total dollar value, total contract count and over-age reports. Ad hoc queries enable the ACO to sort the contract data base to better control and manage their workload. COMPASS also generates canned letters to contractors utilizing the data base.

COMPASS was initially resourced in 1987 under the heading Workload Inventory and by November of 1989 the ACO workstation had been disseminated throughout the Defense Contract Administration Service. Lengthy data download greatly hampered COMPASS effectiveness. The new version incorporates a new download scheme and local area networks (LAN) to alleviate long data delays. The download of MOCAS data for a typical ACO team now takes less than five minutes. Further COMPASS refinements will expand the canned letter capabilities, inquiry options and eliminate many hardcopy ACO data products.

The Audit Transmission System (ATS) is a subgroup of COMPASS. ATS electronically transmits Defense Logistics Agency (DLA) field pricing requests for audit support to the Defense Contract Audit Agency (DCAA) and provides for the electronic receipt of audit request acknowledgments and audit reports from DCAA. Besides speeding up the audit request and receipt process, receiving the report electronically allows for easy incorporation into the final pricing report.

The Terminations Management System (TAMS) provides automated management of the terminations log. The Terminations Contracting Officer (TCO) can query the terminations data base and generate standard as well as customized reports. Valuable time is saved by automatically generating recurring reports such as the Contract Status Report (DD Form 1598). TAMS provides management on-line visibility of an increasing workload. Version 3 of TAMS, now in development, promises to link DLA Headquarters with field offices through a network. This would allow the merging of all field termination case data into a single database.

1.2 SCOPE

All costs and benefits identified in this study reflect the differences between the current version of the system and status quo. Status quo here is defined as the methodology used before the system existed. All costs prior to FY 93 are considered sunk and, therefore, do not enter directly into the economic analysis.

1.3 OBJECTIVE

This study analyzes the economic feasibility of further expenditures needed to develop and deploy COMPASS, including ATS and TAMS, as well as AUTOQAR. We identified and quantified the benefits of each system and compared them to further costs.

SECTION 2
METHODOLOGY

We identified the benefits for AUTOQAR and COMPASS (including ATS and TAMS). Where possible, we quantified these benefits. We compared benefits to associated costs using discounted cash flows. Discounting takes into account the time value of money. The prescribed 10 percent discount rate was used. All costs incurred prior to Fiscal Year (FY) 1993 were considered sunk and did not directly enter into the analysis. All discounted costs and benefits are expressed in 1993 dollars. Cost data was extracted from the latest versions of the Information Resource Management System (IRMS) and the Project Development Plan (PDP). The cumulative discounted costs and benefits covered the period from FY 93 to FY 01.

SECTION 3
RESULTS

3.1 ECONOMIC ANALYSIS RESULTS

The following are the summary results. All discounted values are expressed in FY 93 dollars and cover the life of each project. See Appendix A for the detailed spreadsheets.

	Cumulative Costs	Cumulative Benefits	Discounted Cumulative Costs	Discounted Cumulative Benefits
		(000s)		
AUTOQAR	$37,388	$72,034	$28,609	$43,694
COMPASS (incl ATS TAMS)	$8,749	$48,585	$6,191	$30,592

The Savings Investment Ratio (SIR) is the ratio of the total discounted benefits to the total discounted costs. AUTOQAR has a SIR of 1.5 while the total SIR for COMPASS is 5.0. Any SIR in excess of 1.00 will return more in benefits than its costs.

COMPASS appears more favorable than AUTOQAR because COMPASS is farther along in development, with more of the cost behind it.

3.2 BENEFITS

3.2.1 AUTOQAR BENEFITS

Tangible benefits are all the result of automated record keeping, report generation and data analysis. When fully implemented AUTOQAR eliminated over 1 million forms and 800,000 hard copies per year. Automated records, reports and data analysis ought to free up some 450,000 QAR staff-hours per year at a GS-10 pay level. These savings free QARs to use their time on more productive duties.

AUTOQAR intangible benefits include the more accurate and timely collection and distribution of data. Manual collection and transcribing of data engenders several causes of error. Fatigue, boredom, and misunderstanding results in erroneous and unusable data. AUTOQAR helps eliminate this drudgery. AUTOQAR will be an invaluable management information tool. Supervisors will be able to track performance in real time. Query capabilities will help ensure critical actions are not inadvertently being overlooked.

3.2.2 COMPASS

Tangible COMPASS benefits involve the elimination of hard copy Contract Management reports and alerts. The number of pages eliminated per year is estimated at 29,236,000 when the system is fully functional in FY 96. At the time of this report only a fraction of this total has been eliminated. (See Appendix C for a list of eliminated reports and alerts). COMPASS, when fully implemented, can reduce the time that each ACO team spends updating and referencing the paper CAR by 3 hours on average. Staff-hours are also saved for those personnel involved in printing and distributing the reports and alerts that will be eliminated.

COMPASS intangible benefits involve the ACO's ability to organize and manipulate contract data in a manner and time frame inconceivable before its implementation. Using COMPASS, an ACO can supply and act on information which either: (1) was not available in the past or, (2) was not retrievable due to time constraints. COMPASS gives the ACO the means to more effectively manage an ever increasing workload. Canned and customized queries let the ACO instantaneously view potential problem contract areas such as: progress payment, zero balance, and over age contracts.

ATS tangible benefits are straightforward. The audit request system currently handles all requests, acknowledgment of requests, and audit reports via paper. ATS automates the entire system and starts a timer the minute the acknowledgment of an audit request is sent electronically. The elimination of the hard copies through automation saves approximately $80,000 per year.

ATS will increase the timeliness and quality of field pricing reports. This ultimately will result in procurement savings. Eventually, as a result of ATS, pricing procedures will change and become fully integrated with Electronic Commerce business transactions.

TAMS tangible benefits result from report automation. The automation of the Contract Status Report (DD Form 1598), which is the focal point of the Terminations office, and the Quarterly Management Information System report, result in savings of $60,000 per year. The DD form 1598, a status report to the Procuring Contracting Officer, is produced when a docket is opened, when it is closed, and every 6 months. No further tangible benefits could be identified with development of Version 3.0 of TAMS.

TAMS places the data involved in the terminations process in an electronic medium making it readily available for manipulation and tracking. Efficiency and effectiveness is increased by using TAMS to view case status and balance workload. Data requests can be easily supplied without wasting production time.

SECTION 4
CONCLUSIONS

Discounted benefits far exceeded costs for both AUTOQAR and COMPASS over the life cycle of these projects. The difference exceeded $15 million for AUTOQAR and $24 million for COMPASS (including TAMS and ATS). The COMPASS results are more dramatic due to the fact that most all of the hardware and software development has already taken place.

The results are so clear that only major changes in project development could affect the results of the analysis.

The realization of system benefits depends on successful implementation. Successful implementation depends on field personnel. Field personnel interviewed for this analysis, requested better access to system developers. This access, possibly by a hotline, could be used to solve user problems and collect suggested improvements.

SECTION 5
RECOMMENDATIONS

Based on cost/benefit analysis results, development should continue for AUTOQAR and COMPASS. Helplines should be established for both systems to: answer questions, ease new user frustrations and receive suggestions for system changes. Without such assistance, realization of benefits may be limited.

APPENDIX A
DETAILED ECONOMIC ANALYSIS SPREADSHEETS

COST DESCRIPTION	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	Total
1.0 Program mgmt/planning										
2.0 Systems investment	883,573	658,862	110,000	50,000	20,000	0	0	0	0	1,722,435
2.1 Hardware	249,000	0	0	0	0	0	0	0	0	
Sunk: $5,768,000 (FY93 $)										
2.11 COMPASS Workstations	102,000	0	0	0	0	0	0	0	0	
2.12 TAMS 382s	147,000	0	0	0	0	0	0	0	0	
2.2 Software	506,960	629,862	110,000	50,000	20,000	0	0	0	0	
Sunk: $1,145,000 (FY93 $)										
2.21 CDA (DSAC-A) COMPASS	138,419	0	0	0	0	0	0	0	0	
2.22 CDA (DSAC-A) ATS	11,247	0	0	0	0	0	0	0	0	
2.23 CDA (DSAC-A) TAMS	357,294	449,862	0	0	0	0	0	0	0	
2.24 Commercial Soft-COMPASS	0	180,000	110,000	50,000	20,000	0	0	0	0	
2.3 Training/Travel Cost	127,613	29,000	0	0	0	0	0	0	0	
2.31 COMPASS Travel/Training	82,613	0	0	0	0	0	0	0	0	
2.32 ATS Travel/Training	4,500	0	0	0	0	0	0	0	0	
2.33 TAMS Travel/Training	40,500	29,000	0	0	0	0	0	0	0	
3.0 Systems operations	576,800	766,896	811,882	811,882	811,882	811,882	811,882	811,882	811,882	7,026,871
3.1 Hardware maintenance	576,800	601,700	601,700	601,700	601,700	601,700	601,700	601,700	601,700	
3.2 Software maintenance	0	165,196	210,182	210,182	210,182	210,182	210,182	210,182	210,182	
Total cost undiscounted	1,460,373	1,425,758	921,882	861,882	831,882	811,882	811,882	811,882	811,882	8,749,306
Discount factor	0.954	0.867	0.788	0.717	0.651	0.592	0.538	0.489	0.445	
Total cost discounted	1,393,196	1,236,132	726,443	617,970	541,555	480,634	436,793	397,010	361,288	6,191,021

BENEFIT DESCRIPTION	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	Total
4.0 Labor Cost Avoidance	446,478	2,232,390	2,232,390	2,361,982	2,361,982	2,361,982	2,361,982	2,361,982	2,361,982	19,003,148
4.1 COMPASS Labor Savings	434,446	2,172,231	2,172,231	2,301,823	2,301,823	2,301,823	2,301,823	2,301,823	2,301,823	
4.2 TAMS Labor Savings	12,032	60,159	60,159	60,159	60,159	60,159	60,159	60,159	60,159	
5.0 Paperwork reduction	1,627,679	1,699,384	1,699,384	4,079,157	4,079,157	4,079,157	4,079,157	4,079,157	4,079,157	29,501,392
5.1 COMPASS Savings	1,619,712	1,619,712	1,619,712	3,999,485	3,999,485	3,999,485	3,999,485	3,999,485	3,999,485	
5.2 ATS Savings	7,967	79,672	79,672	79,672	79,672	79,672	79,672	79,672	79,672	
Total benefits undiscounted	2,074,157	3,931,774	3,931,774	6,441,139	6,441,139	6,441,139	6,441,139	6,441,139	6,441,139	48,504,538
Discount factor	0.954	0.867	0.788	0.717	0.651	0.592	0.538	0.489	0.445	
Total benefits discounted	1,978,746	3,408,848	3,098,278	4,618,496	4,193,181	3,813,154	3,465,333	3,149,717	2,866,307	30,591,821

AUTOMATION OF IN-PLANT QAR

COST DESCRIPTION	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	Total
1.0 Program mgnt/planning										
2.0 Systems investment	7,606,078	8,640,446	1,529,194	1,215,000	820,000	0	0	0	0	19,810,718
2.1 Hardware Purchases	4,515,000	3,225,000	400,000	800,000	600,000	0	0	0	0	
Sunk: $8,181,000 (FY93 $)										
2.11 382's	630,000	0	0	0	0	0	0	0	0	
2.12 PCs/Workstations	3,885,000	3,225,000	400,000	800,000	600,000	0	0	0	0	
2.2 Software	3,084,878	529,479	0	415,000	220,000	0	0	0	0	
Sunk: $1,350,000 (FY93 $)										
2.21 CDA(DSAC-A @ $54.07/hr)	925,678	30,279								
2.22 Commercial PC Software	499,200	499,200	0	0	0	0	0	0	0	
2.23 Contractor Soft. Devel.	1,660,000	0	0	415,000	220,000	0	0	0	0	
2.3 Training Costs	6,200	4,885,967	1,129,194	0	0	0	0	0	0	
2.31 Travel	6,200	156,800	39,200	0	0	0	0	0	0	
2.32 Training	0	4,729,167	1,089,994	0	0	0	0	0	0	
3.0 Systems operations	818,100	1,663,168	1,988,696	2,028,696	2,150,196	2,232,196	2,232,196	2,232,196	2,232,196	17,577,638
3.1 Hardware maint	818,100	1,269,600	1,592,100	1,632,100	1,712,100	1,772,100	1,772,100	1,772,100	1,772,100	
3.2 Software maint	0	393,568	396,596	396,596	438,096	460,096	460,096	460,096	460,096	
Total cost undiscounted	8,424,178	10,303,614	3,517,889	3,243,696	2,970,196	2,232,196	2,232,196	2,232,196	2,232,196	37,388,356
Discount factor	0.954	0.867	0.788	0.717	0.651	0.592	0.538	0.489	0.445	
Total cost discounted	8,036,666	8,933,233	2,772,097	2,325,730	1,933,597	1,321,460	1,200,921	1,091,544	993,327	28,608,575

BENEFIT DESCRIPTION	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98	FY 99	FY 00	FY 01	Total
4.0 Labor savings	0	988,355	9,883,555	9,883,555	9,883,555	9,883,555	9,883,555	9,883,555	9,883,555	70,173,240
5.0 Paperwork reduction	0	26,211	262,109	262,109	262,109	262,109	262,109	262,109	262,109	1,860,972
Total benefits undiscounted	0	1,014,566	10,145,663	10,145,664	10,145,664	10,145,664	10,145,664	10,145,664	10,145,664	72,034,212
Discount factor	0.954	0.867	0.788	0.717	0.651	0.592	0.538	0.489	0.445	
Total benefits discounted	0	879,629	7,994,783	7,274,441	6,604,827	6,006,233	5,458,367	4,961,230	4,514,820	43,694,329

APPENDIX B
ASSUMPTIONS AND CALCULATIONS

APPENDIX B
ASSUMPTIONS AND CALCULATIONS

GENERAL

1. The project life of all ADP projects is assumed to cover 8 years with all benefits being realized 1 full year after completion. Partial benefits accrue within the first year.

2. Costs incurred prior to FY 93 were considered sunk.

3. Pay rates were adjusted for fringe benefits using a factor of 29.55%. Step 5 of a pay grade was used in labor cost calculations.

4. Software development done by DLA Systems Automation Center (DSAC-A) was calculated using a 160 hour staff month at the reimbursable rate of $54.07 per hour.

5. The source of cost information is the Information Resource Management System (IRMS) dated 93/02/19 for all hardware and off the shelf software. The source of DSAC-A software development costs is the MOCAS Project Development Plan (PDP) dated 27 Sep 92 - 25 Sep 93.

6. Ten percent of the purchase price (FY93 $) of previously bought hardware was the rule of thumb used to estimate the annual hardware maintenance cost.

7. Software maintenance costs were assumed to be equal to the development costs over the life cycle. These costs were charged at the rate of 10 percent per year, after the software development was completed. These rules of thumb were derived from Dr. Barry Boehm's book, *"Software Cost Economics."*

8. The standard discount rate of 10 percent was used to project costs and benefits in FY 93 dollars.

9. A savings figure of $.2268 per page was used when considering the reduction in paper forms and reports. An imaging cost of $.09 was used when comparing one page of paper to one page of imaging storing and processing. This yielded a net per page savings of $.1368. These figures are from an article titled "Paper Versus Imaging" in *Government Computer News.*

10. All line charges for networking and data communications were considered sunk costs.

11. All software documentation costs were assumed to be included in the software development costs.

AUTOQAR

12. Since AUTOQAR hasn't been implemented, we confirmed the training and travel data from the last report, delayed the timing, and updated costs to the current pay scale. (Spreadsheet line 2.3)

13. Due to development problems, Synergy was awarded a contract for software development for up to $1,660,000. This information comes from the Information Resource Management System (IRMS) and Ms. Ethel Berg of DLA CAAI. (Spreadsheet line 2.23)

14. DSAC-A development costs in the PDP were adjusted by Mr. Ron DiPadova of DLA CAAI due to the hiring of Synergy to complete AUTOQAR development at the PC level. (Spreadsheet line 2.21)

15. Labor cost avoidance is awarded full savings 1 year after completion and 10 percent of the total during the first year (FY 94), reflecting projected implementation. (Spreadsheet line 4.0)

COMPASS

16. Training for COMPASS was calculated assuming that three of the five districts remained to be trained. One instructor will be on per diem, teaching a 1 week course at each site to a total of approximately 74 trainees. All persons involved in the training were assumed to be GS-11 step 5. (Spreadsheet line 2.31)

17. COMPASS labor avoidance costs for the distribution of reports were calculated assuming a GS-3 step 5 saving 1.833 hours per month on 572 teams. This estimate was computed from the numbers and frequencies of the reports listed in Appendix C. These savings will take effect in FY 96. (Spreadsheet line 4.1)

18. The COMPASS cost for printing the CAR was calculated for GS-5 step 5 at 50 sites taking 8 hours to print, 12 times a year. 20 percent savings in FY 93; then 100%. (Spreadsheet line 4.1)

19. Interviews suggested that each ACO team will save an average of 3 hours per week updating, sorting, and sifting through the CAR. A pay grade of GS-11 was used in the calculation. 20 pecent savings in FY 93; then 100%. (Spreadsheet line 4.1)

20. Software development by the Synergy Corporation is currently fixed at $580,000 but could be expanded to the $1,660,000 shown. (Spreadsheet line 2.23)

The number of pages for COMPASS paper cost avoidance is listed in Appendix C.

TAMS

21. Labor savings were based on the automation of two reports: the Contract Status Report (DD Form 1598) and the quarterly Management Information System (MIS) report. The DD form 1598, a status report to the Procuring Contracting Officer, is sent when a docket is opened, closed, and every 6 months. We assumed the average time a contract spent in termination to be 1.5 years. We based workload estimates on FY 92 data. The MIS report relays workload statistics from each of the 16 Terminations offices quarterly. (Spreadsheet line 4.2)

ATS

22. ATS paper costs savings resulted from eliminating the hard copies of audit requests, request acknowledgments, and audit reports. (Spreadsheet line 5.2)

APPENDIX C
HARDCOPY REPORTS ELIMINATED BY COMPASS

APPENDIX C
HARDCOPY REPORTS ELIMINATED BY COMPASS

REPORTS	PAGES PER YEAR (000s)
UYCOO3	61
UNMC260C	61
UYCJ03	350
UYFM03	27
UYFM02	34
UNKE300A	741
UNK100A	446
UNKR150A	274
UYCP08	96
UNAFO30A	20
UYCD02	13
UYCD01	13
UNMC050C	20
UYM001	240
UYFM04	281
UFFM07	89
CONTRACT ADMINISTRATION REPORT*	6,692
RDFs	1,187
ALERTS/OTHER	6,864
ABSTRACTS*	5,148
UNMD040D	3,482
ACC. INFO	1,098
OTHER	2,059
TOTAL	29,236

* SAVINGS START IN FY93; REMAINDER START IN FY96

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Allan R. Greve

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13. ABSTRACT (Maximum 200 words)

This report documents the updated economic analyses of the COMPASS and AUTOQAR systems. The COMPASS analysis included the Audit Transmission System (ATS) and the Terminations Management System (TAMS). Both analyses resulted in a substantial positive net present value of benefits compared to costs. A 10% discount factor was used. All costs incurred prior to Fiscal Year 1993 were considered sunk. An eight year time horizon was used after the scheduled FY93 completion of both systems.

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